common coolant supply". The Examiner argues that this feature is not shown if either of Figures 1 or 7, and that the bottom portion of Figure 7 is so lacking in detail as to appear not to be operative. The Examiner concludes that the first and second heat exchangers 118, 118a are not arranged for heat to be removed from a common coolant supply.

It is submitted that all of this analysis, commentary and argument is based on a poor and incomplete reading of the present specification and drawings, and is essentially incorrect.

As is common, for simplicity, the specification and the drawings did not provide a needless repetition of elements that are common and which are duplicated, which elements would readily be understood by a skilled person. This is made clear in the paragraph at page 9, line 6-12, which for the Examiner's assistance is set out in full:

> The steam line 70 then passes through a T-connection to two separate lines 90, 92 for supplying steam to the separate gas lines for the fuel and oxidant gases. Many elements of these two lines 90, 92 are common, and for simplicity, a description is given just of these elements in the line 90. The corresponding elements in the line 92 are given the same reference numeral but with a suffix "a", it being understood that they have essentially the same function.

Accordingly, the description following this paragraph, almost exclusively focuses on the elements at the top of Figure 7, with it being understood that the corresponding elements at the bottom of the figure, designated by the suffix "a", would correspond and would function the same way. This is standard shorthand in patent specifications, that is commonly used and readily understood.

Thus, the description, starting at page 10, makes it clear that the heat exchangers 118, 126 each have their respective temperature control circuit. The first heat exchanger 118, as detailed at page 10, lines 4-6, has a

temperature control circuit indicated at 132, including a first secondary heat exchanger 134, a pump 136 and a heater 138. Chilled cooling water is supplied to the secondary heat exchanger 134 through supply and return lines 144 and 146 (page 10, lines 7-10).

The temperature control circuit for the second heat exchanger 126 is indicated as generally corresponding (page 10, lines 19-22). It includes a secondary heat exchanger 164, 166 and a heater 168. The chilled water in supply lines 144, 146 is connected through a control valve 178 to the secondary heat exchanger 164.

Thus, what a skilled person would understand is that the two heat exchangers 118, 126 are connected to secondary heat exchangers 134, 164, and that these in turn have heat removed from them by chilled water and supply return lines 144, 146.

At the bottom of Figure 7, corresponding heat exchangers 118a and 126a are shown. A skilled person would immediately and without any difficulty interpret the passage at page 9, lines 6-12 to indicate that corresponding to each of the temperature control circuits 132, 162, a temperature control circuit would be provided for each of the heat exchangers 114a and 126a. Each such temperature control circuit would include a respective secondary heater and heat from each of the secondary heaters would, in a known manner, be removed therefrom by coolant from the common chilled water supply and return lines 144, 146.

Clearly, where it is necessary to remove heat, it is entirely common practice to provide a single source of a cooled or chilled fluid, e.g. water, as a heat sink, to remove heat. Further, a skilled person would recognize that reference to chilled cooling water supply lines is a reference to a central cooling source, providing a common cooling source for all the various heat exchanges.

The Examiner went on to reject claims 1, 7, and 22 under 35 U.S.C. 103(a) as being obvious over the combined teachings of JP 9-35737, JP 5-

256468 and Weitman. This rejection is respectfully traversed for reasons given below.

Fundamentally, it is submitted that the Examiner has failed to meet a number of the basic requirements for establishing a *prima facie* obviousness objection. The Examiner is respectfully reminded of the provisions of MPEP 2143:

> To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (MPEP 2143)

The Examiner first cited JP 9-35737 for teaching two humidifiers 2A and 2B. While this published application is concerned with a solid polymer electrolyte fuel cell, it is noteworthy for teaching a specific construction in which the two humidifiers are formed by plates and the like forming part of the fuel cell stack. Thus, is specifically taught that the humidifying device 2A is a three unit stack, while a device B is a stack of two units. Further, somewhat surprisingly, it is specified that a "heat medium 99" is supplied through the stack 1, as shown in the drawing. This so-called heat medium 99 apparently also does double duty as coolant for the stack. As such, to the extent that this disclosure can be understood, the temperature would be quite different at either end of the stack.

In any event, it is clear that this arrangement provides a crude form of humidification. There is no control of the temperature and the level of humidification of either gas flow, and the level of humidification would seem to be somewhat arbitrary.

Accordingly, this reference fails to provide all the elements of the presently claimed invention.

The Examiner then relies of JP 5-256468 and Weitman. Before considering these disclosures in detail, it is submitted that both of them are clearly non-analogous art. The Japanese reference is entitled "Method and Device for Supplying Clean Air", while the Weitman reference is concerned with "An Apparatus for Treating Contaminated Gas". Both of them are generally concerned with supply of air for a clean room (the Japanese reference), or air to some large manufacturing facility such as textile industry, weaving industry, etc. (column 1, line 24 of the Weitman reference).

As is well known, for such applications, the volume of air involved is large. On the other hand, it is not necessary for the level of humidity to be accurately controlled, and more significantly, there is absolutely no requirement for the humidity level to be capable of being abruptly and quickly changed.

In contrast, for a fuel cell, particularly a fuel cell that is operated in an automotive or like environment, there is commonly a requirement for the level of humidity to be both tightly controlled and to be capable of rapid and abrupt change as required. A fuel cell used in a vehicle or other automobile, or even some other application, often has to be operated under conditions requiring rapid and often instantaneous changes in power levels, which in turn can require the humidity levels of the incoming gases to be abruptly changed.

For all these reasons, it is submitted that a skilled person would not consider the JP 5-256468 and the Weitman reference any way analogous or in any way useful in addressing the humidity problems for a fuel cell stack.

Note also that this invention is particularly concerned with humidity control in a test station, where again, there is a requirement to change humidity levels quickly and to have humidity levels set accurately and to maintain these at accurate levels. Again, these features are entirely absent in conventional control equipment for air supplies to buildings and the like.

A further consideration is that it is not seen how either or both of these references could be incorporated into the primary reference JP 9-35737, without destroying or altering this reference. The first Japanese reference is a fuel cell structure, whereas the other references are large scale equipment for humidifying air for buildings and the like, and which employ large, discreet components.

Accordingly, it is submitted that there is simply no reason or basis for the proposed modification and that the proposed modification renders the prior art (the first Japanese reference) unsatisfactory for its intended purpose. (See MPEP 2143.01 and the first requirement in the paragraph cited above.)

Turning to the details of these references, in Japanese 5-256468 reference, the Examiner alleges that this teaches a "steam source 24"; it is noted that the English abstract refers to the element 4 as a "water-vapor generator 24", which is something quite different. In any event, this is connected to a mixing tank for receiving air from a prefilter 22. The humidified air then passes through tank 26 including a cooler tank 25. The temperature controlled heater 31 is used to reheat the air.

Note that the humidity control in this Japanese reference is achieved entirely differently. A dew point instrument 25 controls a humidity control 30, to permit some of the generated water vapor to be added down stream from the cooling tank 25; this being entirely different from the present invention.

In contrast, the technique of the present, invention can be summarized as: adding excess humidity; chilling to condense out excess humidity and establish known humidity level; and reheating to known temperature with known relative humidity. This enables rapid and accurate control of the humidity level. The technique of JP '468 is crude and would not provide accurate control. It may be suitable for supplying clean air to a room, where tolerances etc. are quite different, but is has no applicability to the fuel cell field.

In any event, to reiterate the previous comment, it is not seen how this elaborate arrangement could in any way be combined with the first Japanese reference JP '737.

The Examiner argued that it had been obvious to omit the due point instrument 29 and controller 30, to obtain "a less expensive structure". It is submitted that such an argument is not permissible where is can be shown that the functions required, i.e. the functions of the present invention, would not be obtained. The Examiner has failed to establish that this theoretical modification does provide all the functions of the present invention.

The Examiner further argued that it would have been obvious to have replaced the saturator 1 of Weitman with units 20, 24 and 25, 27 and 28 with JP '468. It is submitted that there is simply no reason or basis in this art to do this. The saturator of Weitman is wholly self-contained and functional by itself, and there is no need to consider replacing it. In any event, this whole argument revolves around apparatus in the art of heating and ventilating equipment, with no relation to fuel cell technology, i.e. you would still not have an apparatus suitable providing the accurate, rapidly changing humidity requirements of a fuel cell.

The Examiner further argued that in view JP '737, it would have been obvious to duplicate the aforementioned JP '468/Weitman system for as many humidifier process streams desired, noting that in the case of fuel cells, this would be two streams, one for the fuel gas and one for the oxidizing gas.

This wholly overlooks the fact that the purely theoretical JP '468/Weitman system is in a wholly different art. As noted, both these disclosures are concerned with heating and ventilating systems. In such systems, the only stream to be conditioned is an air stream, and there is simply no reason to consider duplicating systems for another stream.

More significantly, these proposals are concerned with non-analogous art and are configured on a size and scale and in a manner which is wholly different from anything found in fuel cell technology. The JP '737 scheme

provides a compact humidifier arrangement contained within the fuel cell stack. To suggest that this teaching could somehow be combined with or be somehow relevant when taken with two teachings from the heating and ventilating art is well outside any permissible obviousness argument found within the MPEP. The art is non-analogous, and there is simply no reason or basis in this art to consider such a proposal.

With respect to the other claims, it is submitted that, as a general statement, they are allowable as being dependent from an allowable independent claim, but comments are made below on some individual, dependent claims.

The Examiner rejected claims 4 and 5 as being obvious with the disclosures in Ebbing et al. and Othmer were further considered. Again, it is submitted that these patents are from a non-analogous field, and that the Examiner has failed to establish a proper *prima facie* case of obviousness.

With respect to claims 8, 9 and 17-21, the Examiner further relied upon the disclosure in Oswalt et al. With respect to claims 11 and 12, the Examiner relied upon the disclosure in Gunter. Again, it is submitted that these patents are concerned with non-analogous art, and that the Examiner has not made out a proper *prima facie* obviousness argument.

With respect to claim 12, the Examiner again argued that it would have been obvious to duplicate the shut-off valve, pressure regulator and non-return valve for each humidifier. Again, given the wholly different structure in the JP '737 reference, it is submitted that it would have been in fact obvious to make this proposed combination.

Accordingly, in view of the arguments above, it is submitted that the claims as they stand are both novel and inventive over the known art. Early review and allowance are requested.

Respectfully submitted,

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